18, and said valve is operated by a float 21, which is supported by the liquid, said float being guided in its movement by a stem 22, which works through a spider-frame 23 within the casing.

In order to deflect the air and the mixture as they enter the cylinder, I provide the rear end of the piston with a deflecting-plate 24, said plate causing the air and mixture to pass to the rear of the cylinder and sweep out any burned gases that tend to remain therein.

I deem it desirable to diminish as far as possible the capacity of the crank-chamber within which the mixture is compressed before it is admitted to the cylinder, and for this reason I cause the piston to move as close to the crank as possible, the front end of the piston being concaved at 25, so as to secure this result, the concavity in the piston conforming in shape to the path of the outer portion of the crank.

In Fig. 2 the parts are shown in the position which they assume after the explosion and before the piston starts to return. As the piston returns both the inlet and exhaust ports are closed and the explosive mixture in the cylinder is compressed. During this same movement a partial vacuum is created in the crank-chamber, which causes the outside air to lift the valve 13 from its seat and rush through the pipe 12 into the said chamber. As the air passes over the nozzle of the tube 19 it draws by suction a quantity of gasolene or other fuel into the chamber with it, said action continuing as long as the piston is moving rearwardly. At the instant when the piston reaches its rearmost position the crank-chamber and the pipe 12 in advance of the nozzle on the pipe 19 are filled with the explosive mixture, all of that part of the pipe 12 between said nozzle and the cylinder being filled with atmospheric air. As the piston moves forwardly under the impulse due to the explosion the contents of the chamber and the pipe 12 are compressed, the mixture being driven backwardly for some distance into the pipe. At the instant before the inlet-port is opened, therefore, the pipe 12 is filled for a portion of its length near the cylinder with air, and the remainder of the pipe and the crank-chamber are filled with the explosive mixture, both being under high pressure. When the inlet-port is uncovered, there is a rush of air and mixed gases through the pipe to the cylinder; but the air is in advance of the mixture and is sufficient in volume to sweep out the burned gases due to the former explosion and cleanse the cylinder before the mixed gases can reach the exhaust-port and escape. By this construction I am enabled to introduce into the cylinder a blast of air in advance of the explosive mixture, said air scavenging the cylinder for the reception of the mixture.

Referring again to Fig. 3, it will be understood that when the suction through the pipe 12 takes place the liquid within the casing 18 is lowered, which permits the float 21 to drop sufficiently to admit an additional supply of fluid through the tube 17; but when the air and gases are being compressed the liquid will be forced backwardly through the tube 19, which will lift the float and close the valve 20 against any further admission of liquid until the suction through the pipe 12 again takes place.

From the above description it will be apparent that the capacity of the pipe 12 between the cylinder and the nozzle on the pipe 19 should be such as to suit the capacity of the cylinder, a large cylinder requiring a correspondingly large pipe. The shape of the pipe is not material, although it should not be such as to create excessive friction and resistance to the gases passing therethrough, and it should not be so large in cross-section as to permit the air and gases to rapidly commingle, as in that event pure air for scavenging the cylinder could not be obtained and the mixture would be wasted. As shown in the drawings, this pipe is lengthened by passing it about the cylinder, although this is not a necessary construction.

Many details shown can obviously be modified, and I desire it to be understood that the following claims are not to be limited thereto any further than is necessitated by their plain language or by the prior state of the art.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an explosive-engine, a cylinder, a compression-chamber, a conductor for the explosive mixture connecting the said cylinder and chamber, a valve located in said conductor near the intake opening into the cylinder through which air is admitted into the conductor and compression-chamber, a device independent of said valve for supplying fuel communicating with the conductor beyond the valve from the cylinder, whereby when air is drawn through the valve and conductor into the chamber it will become carbonized as it passes the said device, and when the mixture is admitted to the cylinder it will be preceded by air which has not been so carbonized for the purpose of expelling the exploded gases from the cylinder.

2. In an explosive-engine, a cylinder, a compression-chamber for the explosive mixture, a pipe connecting the cylinder and said chamber, a valve for admitting air to the pipe, said valve being connected to the pipe near the cylinder intake-opening, and a fuel-supply connected to said pipe immediately adjacent the compression-chamber, whereby a column of air is provided in the pipe between the fuel-supply and the cylinder for scavenging the cylinder in advance of the entrance of the explosive mixture.